

IN THE CLAIMS:

Please cancel claims 5, without prejudice.

- 1 1. (Currently Amended) A method of fabricating a membrane electrode assembly
2 for use in a fuel cell, including the steps of:
 - 3 (A) providing a mold that includes a first and second mold plate adapted to
4 impart a desired shape to induce compression to decrease the thickness of
5 components in the mold and to apply pressure substantially evenly across
6 an entire active area of a membrane electrode assembly being fabricated in
7 the mold;
 - 8 (B) providing a lead frame, including at least a first lead frame component that
9 is adapted to be received into said mold;
 - 10 (C) assembling a protonically conductive membrane with catalyst coatings on
11 each of its major surfaces onto said first lead frame component;
 - 12 (D) placing said lead frame containing said membrane into the mold;
 - 13 (E) compressing said second mold plate onto said first mold plate;
 - 14 (F) introducing a moldable material in communication with said mold plates; and
 - 15 (G) allowing the moldable material to cure in said mold to solidify and form a
16 frame around said membrane to produce a membrane electrode assembly
17 for use in a fuel cell.
- 1 2. (Original) The method as defined in claim 1 including the further step of integrating
2 a current collector into said first lead frame component onto which said membrane is
3 placed.
- 1 3. (Original) The method as defined in claim 2 including the further steps of:

2 (A) providing a second lead frame component that includes a second current
3 collector; and
4 (B) sandwiching said catalyzed membrane between the first and second cur-
5 rent collectors;
6 (C) introducing the lead frame components into said mold;
7 (D) compressing the first and second mold plates together;
8 (E) introducing a moldable material into said mold;
9 (F) allowing the moldable material to cure to form the shape of the mold
10 plates thereby forming a sealed fuel cell.

1 4. (Original) The method as defined in claim 1 wherein the step of introducing the
2 moldable material includes injection molding a moldable material into said mold.

1 5. (Cancelled)

1 6. (Currently Amended) A method of fabricating a fuel cell array, including the
2 steps of:

3 (A) providing a mold that includes a first and second mold plate of a desired
4 shape that forms a cavity to induce compression to decrease the thickness
5 of components in the mold and to apply pressure substantially evenly
6 across an entire active area of a membrane electrode assembly being fabri-
7 cated in the mold;
8 (B) providing a sheet of protonically conductive membrane material that has
9 been coated on each of its major surfaces with a catalyst material to form a
10 sheet of catalyzed membrane;
11 (C) providing a lead frame structure that includes a plurality of individual lead
12 frame components that define separate fuel cells;
13 (D) assembling said sheet of catalyzed membrane into said lead frame struc-
14 ture;

15 (E) placing said lead frame structure containing said membrane sheet into the
16 mold;
17 (F) compressing said second mold plate onto said first mold plate;
18 (G) introducing a moldable material in communication with said mold plates;
19 and
20 | (H)(H)allowing the plastic to cure in said mold to solidify and form a frame
21 around said individual fuel cells to produce a fuel cell array.

1 7. (Currently Amended) A method of establishing a seal around a fuel cell, comprising
2 the steps of:

3 (A) providing a lead frame assembly including:
4 (i) providing first and second current collectors adapted to serve as lead
5 frame components in an associated mold device;
6 (ii) assembling fuel cell components including:
7 (a) a catalyzed protonically conductive, electronically non-
8 conductive membrane; and
9 (b) first and second diffusion layers disposed on opposite sides of
10 said membrane;
11 (iii) arranging said fuel cell components between said first and second current
12 collectors;
13 (B) inserting the resulting lead frame assembly into a molding device;
14 (C) introducing a moldable material into said molding device having a mold
15 cavity designed such so as to decrease the thickness of components in the
16 mold and to apply pressure substantially evenly across an entire active
17 area of the membrane being fabricated in the mold; and
18 (D) allowing said moldable material to cure to seal the edges of the lead frame
19 assembly against leaks to thereby seal the fuel cell.

1 8. (Original) The method as defined in claim 7 comprising the further step of spot
2 welding the first and second current collectors that serve as lead frame components to-
3 gether to maintain the components in place.

1 9. (Original) The method as defined in claim 7 including the further step of trim-
2 ming excess lead frame component portions away from said fuel cell to result in a fin-
3 ished fuel cell.

1 10. (Original) The method as defined in claim 7 including the further step of provid-
2 ing said mold device with a mold cavity which, when said moldable material is intro-
3 duced into said mold cavity and cured, creates a frame around said fuel cell.

1 11. (Currently Amended) A method of establishing a sealed diffusion layer for use in
2 a fuel cell including the steps of:

- 3 (A) providing a first current collector integrated into a lead frame component;
- 4 (B) applying a diffusion layer material to said first current collector on
5 said lead frame component;
- 6 (C) providing a second current collector integrated into a lead frame compo-
7 nent;
- 8 (D) applying a second diffusion layer material to said second current collector
9 on said lead frame component;
- 10 (E) placing a catalyzed protonically conductive, electronically non-conductive
11 membrane between said first lead frame component and said second lead
12 frame component to form an assembly;
- 13 (F) placing said assembly into a molding device;
- 14 (G) closing mold plates associated with said molding device and hot pressing
15 the assembly for a predetermined time period to decrease the thickness of
16 components in the mold and to apply pressure substantially evenly across
17 an entire active area of a membrane electrode assembly being fabricated in
18 the mold;

19 (H) introducing a moldable material into said mold cavity of said mold device;
20 and
21 (I) allowing said moldable material to cure to seal said lead frame compo-
22 nents integrating said first and second current collectors together to form a
23 fuel cell.

1 12. (Original) The method as defined in claim 11 wherein step (H) includes an insert
2 molding technique.

1 13. (Original) The method as defined in claim 11 including the further step of spot
2 welding said first and second lead frame components together to maintain said compo-
3 nents in position prior to placing the assembly into the molding device.

1 14. (Currently Amended) A method of introducing compression into a fuel cell, com-
2 prising the steps of:

- 3 (A) providing a catalyst coated membrane;
- 4 (B) providing a first current collector integrated into a first lead frame compo-
5 nent suitable for being received into a molding device;
- 6 (C) providing a second current collector integrated into a second lead frame
7 component suitable for being received into a molding device;
- 8 (D) assembling said first and second current collectors on either side of said
9 membrane to result in an assembly;
- 10 (E) placing said assembly into said mold device that has been provided with
11 mold plates that form a cavity that induces compression to decrease the
12 thickness of components in the mold and to apply pressure substantially
13 evenly across an entire active area of a membrane electrode assembly be-
14 ing fabricated in the mold;
- 15 (F) closing said mold plates and maintaining said mold plates in a closed posi-
16 tion to induce further compression; and

17 (G) introducing a moldable material into the resulting mold cavity thereby cre-
18 ating a frame around the fuel cell that maintains compression within said
19 fuel cell without the need for mechanical fasteners.

1 15.-20.(Cancelled)